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A NEW SPECIES OF CYBOTOID ANOLE (SAURIA, IGUANIDAE) FROM HISPANIOLA

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ABSTRACT. *Anolis stralimi*, a new species of clivicolous cybotoid anole from Hispaniola, occurs both north and south of the Sierra de Baoruco, the mountain range associated with the Dominican Península de Barahona. Two subspecies are recognized. Additionally, a new subspecies of *Anolis longitibialis* Noble is named from the Península; nominate *A. l. longitibialis* occurs on Isla Beata off the southern tip of the peninsula. Details of distribution and known ecology of the two species are given, and comparisons of the two species (and their respective subspecies) are made. A hypothetical evolutionary and geographical sequence relating these two species to parent *A. cybotes* has been postulated.

INTRODUCTION

Anolis cybotes Cope is the first-named of a series of related taxa of Hispaniolan anoles. *A. cybotes, sensu stricto,* is a widespread mesophilic species of moderate size that occurs in wooded to rather open situations throughout much of Hispaniola. Although the species prefers mesic habitats, it does not completely shun situations which are xeric. In extremely arid areas, the species is often confined to oases or other shaded enclaves. It reaches elevations in excess of about 1,525 m, depending upon which named upland populations one accepts as subspecies of *A. cybotes* (see Schwartz and Thomas, 1975:77). The species is also known from several of the Hispaniolan satellite islands: Ile de la Gonâve, Isla Catalina, Isla Saona, Ile-à-Vache, Ile de la Tortue, and Ile Grande Cayemite. Only on the first of these has an endemic subspecies been named. The present paper

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does not attempt to deal with those named populations (*armouri* Cochran, *doris* Barbour, *haetianus* Garman) that are or have been associated with *A. cybotes* nomenclaturally.

Three other species form the *cybotes* complex. *A. shrevei* (Cochran, 1939) is restricted to the uplands of the Dominican Cordillera Central; this has been recently affirmed as a distinct species by Williams (1975). A xerophilic ally of *A. cybotes* is *A. whitemani* Williams. This species centers in the Cul de Sac-Valle de Neiba plain, which today encompasses the area between the north and south paleoislands (Williams, 1961), east into the Llanos de Azua. *A. whitemani* and *A. cybotes* occur macrosympatrically in this region; the former occupies xeric situations whereas the latter occupies oases and riverine woods — shaded, mesic situations. There are also records of *A. whitemani* from the northwestern Haitian Presqu'île du Nord Ouest (Môle St. Nicholas) and near Gonaïves. It is likely that these "isolated records" are one end of a linear coastal range from the Cul de Sac Plain along the Golfe de la Gonâve onto the xeric northwestern peninsula, but records are absent to affirm this continuity. *A. whitemani* is also known from the xeric Monte Cristi region in northwestern República Dominicana. Most recently, Williams (1975) named *A. marcanoi* from the southern xeric slopes and associated plains of the Sierra de Ocoa, a southern affiliate of the Cordillera Central. *A. marcanoi* is sympatric (and even rarely syntopic) with *A. cybotes*. Williams has given very pertinent details of this association, and Webster (1975) affirmed species-rank for *A. marcanoi* by electrophoresis. These two species differ slightly meristically, but in living animals the dewlap color and the head and body pattern are distinctive and dichotomous.

Anolis longitibialis was described from Isla Beata, off the southern tip of the Península de Barahona. Cochran (1934) first combined *A. longitibialis* with *A. cybotes;* the species are indeed very similar in general appearance and scutellation. It would seem quite logical that wide-ranging *A. cybotes* would have a local insular population on Isla Beata, despite the absence of *A. cybotes* from the Península de Barahona itself, at least as far as Cochran's data (1941) suggested.

In 1969, Richard Thomas collected a single large female cybotoid on the Península de Barahona. This lizard was so much larger than

female *A. cybotes* from the adjacent foothills of the Sierra de Baoruco that suspicion was aroused that it might represent *A. c. longitibialis*. Comparisons were made, and it was determined this lizard was indeed much more similar in size and ventral scutellation to Beata lizards than to *A. cybotes* from the nearby mountains. In 1971, at a locality 9.6 km N of Pedernales, I collected *cybotes* and *longitibialis* at the same locality; the habitat was grassy and shrubby pasture adjacent to limestone cliffs and their talus. Since Thomas's lizard was secured sleeping adjacent to a cave in limestone cliffs, it seemed a possibility that on the mainland *longitibialis* was limited to this habitat, whereas *cybotes* preferred more shaded and less extreme habitats. There was no doubt, however, that we were dealing with two distinct species, *A. cybotes* and *A. longitibialis*, which have limited sympatry and syntopy on the Península de Barahona, and of which one (*A. longitibialis*) occurs also on Isla Beata.

In June 1974, Fred G. Thompson of the Florida State Museum collected in the República Dominicana on the north face of the Sierra de Baoruco near the Dominico-Haitian border, just northeast of the border post of El Aguacate. He courteously lent me his material from that expedition. Two anoles from 2 km NE of El Aguacate are extremely distinctive; both are males, one is very large, and each has its head more attenuate with a different profile and is much less "jowly" than *A. cybotes*. Most pertinently, the dewlaps were mustard-colored when I examined them 4 months later. Although this is not the dewlap color in life of this population, nevertheless, the retention of such deep and distinctive colors after preservation suggests the dewlaps are differently and brightly colored in life, in contrast to the pale colors of *A. cybotes*.

In December 1974, Michael H. Strahm and I made an attempt to reach Thompson's locality; however, the road to the north face of the Sierra de Baoruco from La Florida was in disrepair and our vehicle was unable to reach the high elevations (900 m) needed to secure the lizards. Dr. Thomson had advised me that the lizards were common on rocky and exposed roadcuts, but we never reached such a situation. In the summer of 1975 we were successful in reaching El Agucate from the north, where the road has high to moderate artificial "cliffs" along its eastern margin as it ascends the mountains. We finally found a population of Thompson's lizards

and secured a series on three visits. My earlier contentions proved correct: 1) the dewlaps are very brightly colored, and 2) the lizards are large and are confined to creviced roadcuts in this area. Their status as a species distinct from *A. cybotes* was confirmed by taking typical *A. cybotes* on fenceposts across the road (5m) from the cliffs which harbored the new lizards. Thus we seemed to have an easily solvable problem: a derivative of *A. cybotes* which is very specialized in habitat (cliff faces) occurring on the north face of the Sierra de Baoruco at elevations of about 900 m. The two species differ grossly in adult size, head shape, and dewlap color as well as in habitat; there was no question that they are distinct and sympatric.

Also during the summer of 1975, Ernest E. Williams and William E. Haas, while collecting in the Península de Barahona lowlands, encountered large cybotoids in a shaded and fairly mesic ravine near sea level at a locality 5 km SE and 2.9–3.0 km N of Pedernales. Superficial examination of their specimens in the field, and subsequent collection of a short series taken there by Thomas Wiewandt and Diderot Gicca, all served to confirm that these lizards were very comparable to the series from high elevations on the north face of this same mountain range. The habitat of the new population near Pedernales is very like that of the El Aguacate specimens — a limestone ravine or wash that is much creviced; however, vegetationally this ravine is much more shaded and mesic than the bare and exposed road cut near El Aguacate.

In 1975 Richard Thomas secured a fine series of *A. longitibialis* at a locality 17 km NW of Oviedo that represents the easternmost record for the species. This locality is a wooded but xeric ravine with creviced limestone walls, that lies on the eastern edge of the north-south limestone ridge which bisects the Península de Barahona. There are specimens of *A. longitibialis* from west (Pedernales) and east (17 km NE of Oviedo) of the ravine which harbors the differently-colored dewlapped population discovered by Williams and Haas. Both species in this region show a predilection for limestone cliffs; they and the north slope lizards show remarkable agility and familiarity with their cliffs and are completely "at home" upon them. Other anoles (*A. cybotes, A. brevirostris* Bocourt) occur on cliffs in this general region but rarely seek refuge in crevices; rather, when pressed, they drop to the ground to hide. This is not true of either the new species or of *A. longitibialis* both of which

almost invariably seek refuge in crevices (see additional comments below). I have never taken the new species at night which suggests that the lizards sleep in crevices. *A. longitibialis*, however, has been secured while asleep on shrubs and low trees adjacent to cliffs. This implies that the two species differ in sleeping sites, although they may forage on the same vertical rocky faces.

Williams (1975:7–8) made the following comment in his "justification" for the naming of *A. marcanoi* despite weak meristic differences between that species and *A. cybotes:* "It becomes more obvious that, in addition to those species in which museum taxonomists rejoice because they are very distinct in terms of the characters conventionally studied, there are in many groups valid biological species only imperfectly separable on museum characters, if at all. This phenomenon is only interesting in terms of the history of museums, not of biology. . . . It will not be necessary in the near future to defend or specially comment on cases like that here described." The same comments, to some extent, apply here. I have no doubt that the peculiarly isolated populations herein described as a new species differ biologically from *A. longitibialis*. Except for some size and modal differences in scale counts, without preknowledge of the dewlap colors as a re-enforcing mechanism, one might be easily led into misinterpreting the situation. Verifying that *A. longitibialis* is distinct from *A. cybotes* required the chance encounter of the two species syntopically after the lapse of two years. *A. longitibialis* geographically surrounds two of the three known populations of the new species. Differences between this new species and *A. longitibialis* are not subtle in life, but assigning long-preserved and discolored museum specimens to one or the other species is and will continue to be difficult. This fact, however, should not be a deterrent from naming a new taxon. Two biological entities (species) exist. It is the duty of the systematist to recognize this fact nomenclaturally and to present whatever data he may have to support his contention.

Before proceeding to the new species, it is pertinent to examine variation in *A. longitibialis*. Noble's (1923) description is detailed but lacks data on some features which are important when comparing the Beata population with the Península de Barahona population. These two samples differ from each other and from the new species about to be named in a number of ways; the differences

in the former case are those which are accepted as being of subspecific rank. Accordingly, I first define *A. longitibialis* in those terms which will differentiate it from the new species, and then name a new mainland subspecies of *A. longitibialis*.

Anolis longitibialis Noble

Anolis longitibialis Noble, 1923, Amer. Mus. Novitates, 64:4.
Type locality: Isla Beata, República Dominicana.
Holotype: AMNH 24329.

Definition. A cybotoid anole characterized by small size (males to 72 mm, females to 59 mm), supraorbital semicircles occasionally not in contact, modally 1/1 scales between the supraorbital semicircles and the interparietal, smaller median dorsal scales (35 to 57 in snout-ear distance), subocular scales often in contact with supralabial scales, usually 4 or 5 postrostral scales, few fourth toe lamellae (15–21), dewlap pale yellow to pale orange, throats of adult males almost always immaculate and rarely streaked.

Anolis longitibialis specuum, new subspecies

Holotype: MCZ 132,370, adult male, 17 km NW of Oviedo Nuevo, Pedernales Province, República, 183 m, 7–8 August 1975, Richard Thomas, coll. Original number RT 3,461.

Paratypes: All paratypes are from República Dominicana, Pedernales Province. ASFS V26,898–901, RT 3,462, LSUMZ 29,541–47, same data as holotype; ASFS V16,728, 6.4 km SE Pedernales, 17 May 1969, J. B. Strong; ASFS V21,531, 8 km N, 2 km E of Cabo Rojo, 1 August 1969, R. Thomas; ASFS V29,766–68, 7 km N, 20.0 km SE of Cabo Rojo, 183 m, 14 August 1971, A. Schwartz; ASFS V30,073–74, 7 km N, 20.0 km SE of Cabo Rojo, 183 m, 22 August 1971, D. C. Fowler; ASFS V42,235, 17 km NE of Oviedo Nuevo, 183 m, 12 August 1975, M. H. Strahm; ASFS V30,086–87, 7 km N, 17.6 km SE of Cabo Rojo, 152 m, 22 August 1971, A. Schwartz, B. R. Sheplan; ASFS V30,114, 9.6 km N of Pedernales, 244 m, 23 August 1971, A. Schwartz; ASFS V41,914, 7 km N, 2 km SE of Cabo Rojo, 29 July 1975, M. H. Strahm; UF/FSM 21,567–68, 1 km SW of Las Mercedes, 380 m, 21 March 1974, R. Franz; MCZ 146,848, 1.2 km E of cave near intersection Cabo Rojo-Pedernales roads, 21 July 1975, W. E. Haas; MCZ 146,849, 7 km N, less than

1.2 km E of intersection of Cabo Rojo-Pedernales roads, 21 July 1975, W. E. Haas; MCZ 128,319, MCZ 128,342–43, 2 km E of turn to Cabo Rojo, 16 July 1971, T. P. Webster, R. B. Huey; MCZ 143,483, Cabo Rojo, behind police station, 5 July 1974, P. E. Hertz, R. B. Huey; MCZ 151,864–78, Cabo Rojo, behind laundry, 1–3 October 1976, W. E. Haas; MCZ 132,378–80, 7 km N, 1.2 km SE of Cabo Rojo, 2 October 1976, N. Atkins, W. E. Haas; MCZ 151,902, 7 km N, 1.2 km E of Cabo Rojo, 2 October 1976, W. E. Haas; MCZ 132,381–82, 17.6 km NW of Oviedo Nuevo, 2 October 1976, W. E. Haas; MCZ 151,828–48, 17.6 km NW of Oviedo Nuevo, 2–3 October 1976, W. E. Haas.

Associated specimen. MCZ 58,419, 30 km NW of Oviedo, Pedernales Province, República Dominicana.

Definition. A subspecies characterized by the combination of large size (males to 72 mm, females to 59 mm, snout-vent length), larger dorsal scales (35–52), larger ventral scales (31–52), usually 4 or 5 postrostral scales, dorsum brown with 4 transverse dumbbells and often 1 pair of sacral blotches, throats of females almost always longitudinally streaked with dark brown, very rarely so in adult males; dewlaps very pale orange to very dull yellow or dirty yellow.

Description. An adult male with a snout-vent length of 71 mm and femur length of 23 mm (measured as proposed by Ruibal and Williams, 1961:214); snout scales at second canthal scales 7, vertical loreal rows 4, supraorbital semicircles in contact, scales between semicircles and interparietal 1/1 (counted as proposed by Schwartz, 1968:260); subocular scales in contact with supralabial scales bilaterally; 5 enlarged scales in supraocular discs, 7 postmentals, 4 postrostrals, 3/3 canthals, 19 fourth toe lamellae on phalanges II + III, 49 median dorsal scales and 43 median ventral scales in snout-ear distance. In life, dorsum brown with 4 darker brown dorsal dumbbells (narrow middorsally), the anterior pair the largest and forming a pair of blotches, somewhat faded along their anterior borders, the posterior 3 very fragmented and barely discernible as dumbbells; a dark but centrally very flattened postocular U, the arms very short and touching the upper eyelids; temples, neck, and remainder of dorsum with scattered longitudinal dark dashes or small spots; a pale narrow subocular crescent; lores and infraorbital area pale and without dark mottling; venter white, chin and throat immaculate; upper surfaces of fore- and hindlimbs concolor with

dorsum and with a very few scattered dark brown dots and without defined crossbands; dewlap dull yellow.

Variation. The series of 76 *A. l. specuum* is composed of 38 males and 38 females. MCZ 151,828 is the largest male with a snout–vent length of 72 mm; the largest female (ASFS V21,531) has a snout–vent length of 59 mm. The smallest lizard is a female (RT 3,460) with a snout–vent length of 37 mm. Femora measurements (in mm.) of all males are 14.2–24.4 ($\bar{x}$ = 21.1) and are 11.8–19.2 (16.5) in all females. Snout scales between the second canthals vary between 6 and 10 ($\bar{x}$ = 7.4; M_o = 7–44% of the specimens); loreal rows are 4 to 6 (M_o = 5–53%); supraorbital semicircles are in contact in 69 specimens and are separated by one row of small scales in five lizards. Scales between the supraorbital semicircles and the interparietal scale are modally 1/1 (40 specimens); other counts include 0/0 (2), 0/1 (3), 1/2 (12), 2/2 (13). Dorsal scales in snout–ear distance are 35–52 ($\bar{x}$ = 44.3) and ventrals in the same distance are 31–52 ($\bar{x}$ = 38.5). The subocular scales may or may not be in contact with the supralabial scales; bilateral separation between these scales occurs in 44 specimens, unilateral contact occurs in six, and bilateral contact in 16; thus, there is contact at least unilaterally between the suboculars and supralabials in 33% of the lizards. Enlarged scales in the supraocular discs vary between five and 11 ($\bar{x}$ = 7.0; M_o = 7 – 27%); this count is difficult to take since there may be many small (but not granular or tiny) scales along the periphery of the disc that might be counted if one desired. Postmental scales are 2 to 9 ($\bar{x}$ = 6.3; M_o – 41%); postrostral scales are 3 to 5 ($\bar{x}$ = 4.2; M_o = 4 or 5–36% in each category). Canthals are usually 3/3 but three lizards have 4/4 canthal scales and one has 3/4. Fourth toe lamellae on phalanges II + III are 15–21 (x = 17.6); femur/snout–vent length ratio × 100 is 28.7–36.3 ($\bar{x}$ = 32.5) in males, 28.8–35.2 (33.2) in females.

Color notes in life on both males and females indicate that the dorsal ground color is brown with darker brown markings. There is often a white subocular semicircle and a gray lateral stripe which may be absent or may be suggested by the remnants of dark dorsal and ventral outlining. In males there are usually four dumbbell-shaped figures with their narrowest portions lying across the midline of the back and followed by a pair of dark sacral blotches; of the dumbbells, the first is the best defined and largest and is less clearly

delimited anteriorly than posteriorly as in the holotype. Occasional adult males (MCZ 128,342) are virtually patternless above, without traces of the dumbbells and with only some longitudinal dashes and dark dots remaining. Another smaller male (ASFS V16,728) has only the finest transverse indications of the dumbbells, whereas in a comparably sized male (ASFS V30,074) the dumbbells are large and form prominent butterfly-shaped markings across the back. The truncate postocular U described for the holotype is present in most males, but may be very reduced, only indicated, or absent. A fine, vertically diagonal dark line often courses across the temporal region toward the dorsal midline and may even occasionally (MCZ 128,342) form a complete nuchal V or vague W. The throats of males are variable; young specimens have them streaked with dark brown while full adults have them most often immaculate. An exceptional male (RT 3,462) has streaking remnants on the throat at a snout–vent length of 71 mm.

Females have the same dorsal pattern variation as do males. The dumbbells are, when present, conspicuous, dark, and well developed. Some females (ASFS V30,086) have the dorsal pattern much reduced or even absent and the postocular truncate U is more often only indicated rather than present and well developed. One female (ASFS V41,914) was described in life as having an orangish middorsal streak with dark brown dorsal flecking between the dumbbells. The throats of females are variable — many are longitudinally streaked with dark brown whereas others have the throats immaculate white. Therefore there seems to be no correlation of size and throat streaking.

Male dewlaps have been described as orange, pale orange, dirty yellow, or dull yellow (the latter two conditions at the type-locality). A male (ASFS V30,074, snout–vent length 54 mm) was recorded as having the dewlap orange (Pl. 9K5; all color designations from Maerz and Paul, 1950); a topotypical male (ASFS V42,235; snout–vent length 67 mm) had the dewlap dull yellow (Pl. 12I6) shortly after death. The vestigial dewlaps in females were recorded as pale orange to orange.

Comparisons. A. l. longitibialis from Isla Beata (Schwartz and Thomas, 1975:89, incorrectly assigned *A. longitibialis* to Isla Alto Velo whence the species is unknown) differ from *A. l. specuum* in several ways. The Beata subspecies is smaller (males to 67 mm,

females to 57 mm snout-vent lengths), the dorsal scales (39–57) and ventral scales (29–51) are smaller, and there are modally four postrostrals (46%).

The series of *A. l. longitibialis* consists of 30 males and 13 females. The dorsal coloration in life is grayish tan to gray-brown and the color closely matches the cliffs upon which the species lives on Isla Beata. In males, the lower sides are greenish and in this sex the pattern consists of a series of longitudinal fine dark brown lines, dashes, or dots; there is no indication of dark brown dumbbells. The truncate occipital U is barely indicated at best and is usually absent; the fine diagonal temporal line is present but faint or fragmented. All these features, plus dorsal ground color, differentiate *A. l. longitibialis* from *A. l. specuum*. Throats of males are almost always immaculate; seven males show some vague streaking or dark scribbling on the throats. Females are much like the males dorsally, except that there may be a more clear indication of the dumbbells (AMNH 41,431) than in males. Female throats always show some indication of dark streaking or scribbling, but this is seldom bold and prominent. Noble (1923:4) noted that *A. longitibialis* from Isla Beata had the dorsum with "a fine penciling of dark brown." He also commented that the color (in alcohol) was pale chocolate-brown, finely marked with a number of narrow lines of dark brown. Some of the lizards which were available to Noble have been examined by me and they still retain these features.

One peculiarity of Noble's description is his comments on dewlap color. He stated (1923:4) that the dewlap was "bright" and that it "oddly enough, sometimes retains its color in preservative." This latter is a peculiarity of this species, of *A. marcanoi*, and of the one next to be described. Most Antillean anoles with orange, red, or yellow dewlaps lose the pigments shortly after preservation; but this seems not to be the case in these cybotoids. Despite Noble's comments on dewlap color and its persistence in *A. longitibialis*, nowhere does he mention what are the characteristics of the bright dewlap color except to say that it is "yellowish." Thomas's (1964) field notes state that in males the dewlap is dirty yellow anteriorly to orange on the posterior three-quarters of the dewlap. It appears that the dewlap color in the two subspecies of *A. longitibialis* is fairly comparable.

Remarks. There is one specimen (MCZ 58,419, from 30 km NW of Oviedo, Pedernales Province) of whose status I am uncertain. This is an adult male 67 mm in snout-vent length. It differs from both *A. l. specuum* and the new species described below in that it has a complete dark nuchal band, three complete dark dorsal bands between the limbs, and a pair of sacral blotches that almost form a fourth complete band. There are no distinctive head markings and the specimen is somewhat faded (collected in 1958). If it is an *A. l. specuum,* it is remarkably well patterned dorsally; the throat is now immaculate. The small ventral scales assure that it is not *A. cybotes.* The locality places it within the distribution of the former taxon but I refrain from assigning it to *A. l. specuum* since it differs in pattern details as noted above. I suspect that it is an exceptionally well patterned male *A. l. specuum,* but the cautions noted in the introduction are re-enforced here: without knowledge of habitat or color and pattern in life, one is strongly handicapped in confidently assigning older specimens to any of these taxa.

The name *specuum* is from the Latin for "of the crevices or caves" and alludes to the crevice-dwelling habits of this subspecies. The word *specuum* is genitive plural.

Specimens examined. A. l. longitibialis, **República Dominicana,** Isla Beata, just E of Punta Beata (ASFS V17,215–19); no other locality (ASFS V2,772–80, USNM 83,878, USNM 83,880, AMNH 41,415, AMNH 41,422, AMNH 41,424–32, AMNH 52,449–51, MCZ 17,686, MCZ 31,774, MCZ 37,480–82, UF/FSM 21,572–78).

The new species referred to in the introduction is composed of two populations which differ from each other. Michael H. Strahm collected most specimens of the northern population. Accordingly, I associate his name with this new species, which I call:

Anolis strahmi, new species

Definition. A cybotoid anole characterized by large size (males to 79 mm, females to 64 mm snout-vent lengths), supraorbital semicircles always in contact, modally 2/2 scales between the supraorbital semicircles and the interparietal, larger median dorsal scales (32 to 51 in snout-ear distance), subocular scales always separated from supralabial scales by one row of scales, usually three post-

rostral scales, more fourth toe lamellae (17–24), dewlaps deep orange to deep orange-brown, throats of males marked, or without dark flecking or scribbling, by population.

Head. Moderately massive, length from snout to posterior border of eye much shorter than either femur or tibia. Head scales mostly smooth in males and very weakly carinate in females. Five to nine scales across snout at level of second canthal scales. A very shallow frontal depression and a deeper parietal depression. Nares in front of and above canthal ridge composed of three or four scales. Anterior nasal scale in contact with rostral. Snout distinctly pointed when viewed from above and with a distinctive profile due to the raised nares.

Supraorbital semicircles in contact and are separated from the supraocular discs by 2 rows of granules. Supraocular discs consist of about 4 to 11 enlarged smooth to very weakly keeled (males) or keeled (females) scales separated by about 4 rows of scales and granules from the scales of the supraciliary rows. Two elongate supraciliaries are continued posteriorly by a double row of moderately enlarged scales. Canthus distinct, the first canthal scale the largest. Loreal rows five to nine, the lower rows larger and more regular. Supratemporal area scales are granular, grading rather abruptly into larger scales surrounding the interparietal depression. Interparietal is about the same size as ear opening and is separated from the supraorbital semicircles by one to three scales (modally two) or rarely unilaterally in contact.

Subocular scales are almost always separated from supralabials by one row of scales (very rarely in contact, very rarely by two rows of scales), anteriorly grading into loreals, posteriorly grading into large scales at the corner of the mouth. Usually six supralabials to center of eye.

Mentals are equally broad and long and almost equilateral, and are in contact posteriorly with one to ten small elongate postmental scales. Infralabials are broadly rectangular anteriorly, narrow posteriorly, in contact with three large tetrahedronal sublabials. Throat scales are small, granular, not keeled, and the anterior ones are elongate.

Trunk. Middorsal scales are in two or four abruptly enlarged rows, about four times as large as flank scales and 32–51 in snout-ear distance. Ventrals are small, about 1.5 times as large as

middorsal series, cycloid, smooth, and 31 to 61 in snout-ear distance. Two postanal scales are enlarged in males.

Gular fan. Very large; scales smooth, those along margin about twice as large as ventrals.

Limbs and digits. Hand and foot scales are smooth. Between 14 and 24 scales are under phalanges II + III of fourth toe. Largest scales of arm are smooth to very weakly unicarinate, those of leg smooth and both those of arm and leg are larger than ventrals.

Tail. Slightly laterally compressed, each verticil surmounted by three sharply keeled scales and ventrally by three pairs of unicarinate slightly smaller scales.

Anolis strahmi strahmi, new subspecies

Holotype: MCZ 132,371, an adult male, from 3 km NE of El Aguacate, Independencia Province, 854 m, República Dominicana, taken on 19 July 1975 by Michael H. Strahm. Original number ASFS V41,729.

Paratypes. All paratypes are from Independencia Province, República Dominicana. ASFS V41,730–34, same data as holotype; ASFS V41,284–94, same locality as holotype, 10 July 1975, M. H. Strahm; ASFS V28,453, ASFS V41,308–09, same locality as holotype, 14 July 1975; ASFS V44,991–94, same locality as holotype, 22 December 1976, A. Schwartz, W. B. Southerland; UF/FSM 21,565-66, 2 km NE of El Aguacate, 900 m, 30 June 1974, F. G. Thompson.

Definition. A subspecies of *A. strahmi* characterized by modally eight scales in the supraorbital discs, dorsum is pale gray and is at best flecked with dark gray and often unpatterned, throat is usually unpatterned in both sexes but occasionally has some vague scribbling, and dewlap is very deep orange to orange-brown.

Description. An adult male with a snout–vent length of 78 mm and femur length of 25.5 mm; six snout scales at second canthal scales, seven vertical loreal rows, supraorbital semicircles in contact, scales between semicircles and interparietal 2/2; subocular scales separated by one row of scales from supralabials bilaterally; 11 scales in supraocular discs, six postmentals, three postrostrals, 3 3 canthals, 20 fourth toe lamellae on phalanges II + III, 41 median dorsal scales and 48 median ventral scales in snout-ear distance. In life, dorsum is pale gray with a few scattered darker gray dots, most prominent above the forelimb insertions; remnants of a postocular

truncate U are present, its very short arms abutting against the upper eyelids; supra- and infralabials contrastingly spotted with pale and dark gray; a very pale blue-gray subocular crescent; venter pale grayish, throat immaculate and without pattern; limbs and tail without any crossbands or other prominent markings; dewlap (shortly after death) deep orange (Pl. 4A11).

Variation. The series of 26 *A. s. strahmi* consists of nine males and 17 females. The holotype and another male (UF/FSM 21,566) are the largest males with snout–vent lengths of 78 mm; the largest female (ASFS V41,288) has a snout–vent length of 64 mm. The smallest lizard (ASFS V44,994) is a female with a snout–vent length of 42 mm. Femora measurements (in mm.) in all males are 15.7–26.4 ($\bar{x}$ = 21.5) and are 13.0–21.5 (18.9) in all females. Snout scales between the second canthals vary between five and eight ($\bar{x}$ = 7.0; M_o= 7–43% of the specimens); loreal rows are five to seven (M_o = 5–52%); supraorbital semicircles are in contact in all specimens. Scales between the supraorbital semicircles and the interparietal scale are modally 2/2 (14 specimens), with other counts of 1/0 (1), 1/1 (2), 1/2 (4), and 2/3 (1). Dorsal scales in snout-ear distance are 34–48 ($\bar{x}$ = 39.3) and ventrals in the same distance are 32–61 ($\bar{x}$ = 41.2). The subocular scales are separated from the supralabial scales by one row of scales bilaterally in all but two lizards which have either two rows of scales or are in contact unilaterally. Enlarged scales in the supraocular discs vary between five and 12 ($\bar{x}$ = 8.0; M_o = 8–36%); the same precautions made in the account of *A. l. specuum* apply here. Postmental scales are four to seven ($\bar{x}$ = 5.3; M_o = 6–36%); postrostral scales are three to five ($\bar{x}$ = 3.5; M_o = 3–58%). Canthal scales are always 3/3. Fourth toe lamellae on phalanges II + III are 16–21 ($\bar{x}$ = 18.6); femur/snout–vent length ratio × 100 is 31.7–34.3 ($\bar{x}$ = 33.3) in males and 30.5–36.1 (32.9) in females.

Color notes on both males and females in life indicate the dorsal ground color is gray, remarkably similar to the color of the rocks on which the lizards live. Both sexes are patterned similarly dorsally; there are no dumbbells or flank stripes present (although the position of the latter is occasionally indicated by vague elongate dashes along its putative upper and lower margins). The dorsum is more or less randomly dotted or marked with scattered dashes aligned longitudinally; young males have vague dumbells which are

so reduced as to be only faint transverse lines hollowed laterally — *i.e.*, they are mere vestiges of what presumably are basically dumbbells. The general aspect of the males and females is of a faint and randomly dotted or lineate pattern, but many adults and subadults completely lack any sort of dark body pattern elements. The postocular truncate U is represented by its outlines and these may be fragmented and very obscure. The same is true of the diagonal temporal line. The venter is dark gray to yellowish gray in females. The throat is marked with some confused scribbling, oriented longitudinally in one adult male (ASFS V41,285) and in one subadult male (UF/FSM 21,565; snout-vent length 54 mm). Females generally have gray throats without markings, but one adult (ASFS V41,290; snout-vent length 62 mm) has some vague darker scribbling and two other females have remnants of similar markings only very faintly shown on the posterior portion of the throat. In life, the limbs are crossbanded with pale and dark gray, but these markings are not obvious on the preserved specimens. A distinctive feature of males (and somewhat less so of females) is the spotted supra- and infralabials. A very pale blue-gray subocular crescent is present and moderately conspicuous in life.

The dewlaps in males are very deep orange to orange-brown and these colors are especially rich and almost velvety in texture. Color designations are Pl. 13J10 for one living male and Pl. 11111 and Pl. 4A11 for two recently dead males. Females have the same basic intensity of coloration on their vestigial dewlaps.

Comparisons. Comparisons of *A. s. strahmi* with the subspecies on the south side of the Sierra de Baoruco as well as with *A. l. specuum* will be withheld until the former is described below.

Remarks. I have commented previously on Dr. Thompson's observations on the habitat of *A. s. strahmi.* Our own observations amply confirm his. On 10 July 1975 we searched several kilometers of the road below the post of El Aguacate and saw only very occasional lizards on the gray rocks of the roadcut and did not observe any on adjacent shrubs or herbs. In much of this distance, the roadcut is rather densely covered with vines, small shrubs, and herbs, but elsewhere it is almost bare with only scattered vegetational cover. We finally encountered *A. s. strahmi* in some abundance along an exposed section of roadcut which was about 30 m in length. The roadcut here was almost bare of plants with many

crevices and solution holes. Between 1330 and 1600 hrs this section of roadcut was shaded (due to the direction of its face rather than to any arborescent or herbaceous cover) and the lizards were seen in their retreats, their heads or foreparts extended outside the crevices in an alert manner. They were not easily alarmed, relying upon the extremely cryptic coloration of their gray dorsa agreeing very closely with the hue of the roadcut face. Two lizards were seen "sunning" themselves (in the shade) vertically, head down, on completely exposed rocky surfaces; one was observed clinging to the roof of a small solution hole. In addition to the 11 specimens collected during this 2.5 hour period, at least eight others were seen but not collected. They allowed close (1 m or less) approach of the collector before becoming alarmed and retreating into crevices or solution holes. Recovery time was brief; on several occasions, as we walked slowly down this 30 m stretch of road, we noted refuges of specific lizards. Upon returning a maximum of 10 minutes later the lizards had already reappeared at the crevice mouths (which were their individual retreats) or on adjacent rock faces. On subsequent visits we observed lizards in the same precise places as previously. Their agility and assurance on the rock faces were impressive.

On our third visit to the type locality on 19 July 1975, six lizards were collected between 1720 and 1830 hrs in the same stretch of roadcut. The adult male holotype was taken just below a slightly more covered section. About three or four other anoles were seen but escaped capture. Although the cliff face was completely in shade and the air was cool (but not cold) the rock faces were still warm to the touch.

On 22 December 1976, W. B. Southerland and I visited the type locality once again. Our arrival was at 1200 hr and we saw very few lizards. The roadcut was in shade and the shade increased until 1500 hr so that maximum insolation had occurred in the early morning prior to our arrival. However, the rocks were still warm to the touch. As the afternoon progressed, more *A. s. strahmi* appeared, so that about 12 were seen. Some large males, once disturbed, did not reappear on the roadcut face. Four specimens were taken: a male on an open rock face, a female on a dead stem 8 cm from the base of the cliff and two other females in or near crevices or cavities in the roadcut face. The female noted here on a dead stem is the only individual we observed or collected not on the rocks.

Above and below the road at the type locality are steep slopes. An outstanding feature of the immediate region is the eroded limestone terraces and jumbled rocks and boulders, all sparsely covered with herbs and scattered shrubs and with only occasional large trees. The general aspect of the area is rather bleak.

Two other observations at the type locality are pertinent. We encountered an active *Uromacer catesbyi* Schlegel foraging on the roadcut face occupied by *A. s. strahmi.* These snakes eat lizards but are rarely seen in this habitat type and prefer trees and shrubs. In a crevice at this site we also encountered a young *Epicrates striatus* Fischer; when young, these snakes eat lizards. It is not unlikely that both snakes were associated with this particular section of roadcut because of the ready supply of food (*A. strahmi*). Both snakes are diligent predators in that they search for prey by penetrating crevices, holes, cavities, and other possible hiding places. Elongate *U. catesbyi* is especially well adapted for this foraging pattern during the day and *E. striatus* forages similarly at night.

Anolis strahmi abditus, new subspecies

Holotype: MCZ 146,827, an adult male, from dirt road to Las Mercedes, 2.9 km from intersection (= 5 km SE, 2.9 km N of Pedernales), Pedernales Province, República Dominicana, 19–20 July 1975 by William E. Haas collector. Original number MCZ F-29,006.

Paratypes. All paratypes are from Pedernales Province, República Dominicana. MCZ 146,920, MCZ 146,828–47, same data as holotype; ASFS V41,908–12, same locality as holotype, 29 July 1975, M. H. Strahm; UF/FSM 34,423–27, 5 km SW, 2.5–3.0 km N of Pedernales, 8 August 1975, T. Wiewandt and D. Gicca; MCZ 151,879–901, 5 km SE, 2.9 km N of Pedernales, 30 September and 1 October 1976, W. E. Haas; MCZ 132,383, 5 km SE, 2.9 km N of Pedernales, 30 September 1976, N. Atkins and W. E. Haas; MCZ 151,849–54, MCZ 151,857–63, between 15 and 16 km N of Cabo Rojo, Alcoa road, 3 October 1976, W. E. Haas.

Definition. A subspecies of *A. strahmi* characterized by modally six or seven scales in the supraorbital discs; dorsum tan to grayish tan, at times marked with small brown to reddish blotches; lateral flank stripe tan to whitish present, dorsum with transverse dumb-

bells or hourglasses in both sexes; throat flecked or scribbled in both sexes with dark brown and dewlap deep orange.

Description. An adult male with a snout-vent length of 78 mm and femur length of 26 mm; six snout scales at second canthals, supraorbital semicircles in contact, scales between semicircles and interparietal 2/2, subocular scales separated by one row of scales from supralabials bilaterally; seven scales in supraocular disc, six postmentals, three postrostrals, 3/3 canthals, 19 fourth toe lamellae on phalanges II + III, 35 median dorsal scales and 40 median ventral scales in snout-ear distance. As preserved, the dorsum is grayish brown, with four dark brown dumbbell remnants, all much hollowed or with their lateral expanded ends virtually missing and an additional fifth dumbbell remnant postsacrally; a dull interocular bar and a truncate postocular U, both hollowed; lores, supra-, infra-, and sublabials mottled dark and pale brown; sides of body with elongate dark brown linate fragments, with two of the lowermost fragment-series in part outlining the flank stripe; limbs marbled or mottled dark brown and brown, the only clear transverse dark bar on the crus; both fingers and toes with a moderately clear dark brown crossband; venter grayish to tan, chin and throat dotted with dark brown, sides of abdomen flecked with grayish brown; dewlap pinkish 6 months after preservation.

Variation. The series of 68 *A. s. abditus* consists of 33 males and 35 females. The largest male (ASFS V41,911) has a snout-vent length of 79 mm and the largest female (MCZ 146,838) a snout-vent length of 63 mm. The smallest lizard (UF/FSM 34,425, a female) has a snout-vent length of 39 mm. Femora measurements (in mm.) in all males are 16.0–27.4 ($\bar{x} = 21.7$) and are 13.2–20.8 (18.1) in all females. Snout scales between the second canthals vary between five and nine ($\bar{x} = 6.9$; $M_o = 7$–52% of the specimens); loreal rows are four to seven ($M_o = 5$–62%); supraorbital semicircles are in contact in all specimens. Scales between the supraorbital semicircles and the interparietal scale are modally 2/2 (35 specimens), with other counts of 1/1 (9), 1/2 (5), 2/3 (6), and 3/3 (8). Dorsal scales in snout-ear distance are 32–51 ($\bar{x} = 39.8$) and ventrals in the same distance are 31–53 ($\bar{x} = 40.2$). The subocular scales are separated from the supralabial scales by one row of scales in all but two specimens; these lizards have these scales in contact either bilaterally or

unilaterally. Enlarged scales in the supraocular discs vary between four and 13 ($\bar{x}$ = 7.3; M_o = 6 or 7–27% in each case). Postmental scales are four to 10 ($\bar{x}$ = 7.3; M_o = 6–33%); postrostral scales are three to five ($\bar{x}$ = 3.7; M_o = 3–43%). Canthal scales are most often 3/3, but one lizard has 2/2 and another 3/4 scales in this position. Fourth toe lamellae on phalanges II + III are 17–24 ($\bar{x}$ = 19.0); femur/snout-vent length ratio ×100 is 28.7–38.4 ($\bar{x}$ = 33.5) in males and 30.5–36.3 (33.4) in females.

Color notes state that in both males and females in life the dorsum is tan to grayish tan with five narrow dumbbell or hourglass remnants; these dorsal pattern elements end above the flank stripe which is either tan or white. Despite its prominence in life, the flank stripe is outlined only by dark brown line fragments, including the remnants of the dorsal transverse dumbbells. A dark brown interocular stripe and a postocular truncated U are both present and may be either prominent or vague; the U may be most conspicuous at its posterolateral "corners" on the superior temporal region. Some males (ASFS V41,910–12, MCZ 146,829) show a progressive degeneration of the dorsal pattern into a series of more or less random dumbbell-fragments and associated longitudinal lines or dots which are brown to reddish. In each of these lizards, the peculiar dorsal pattern is obviously a derivative of the customary dorsal dumbbells. Two females (ASFS V41,909, MCZ 146,838) are comparable to the above mentioned males in diminution of the dorsal pattern. In both sexes, the throat is marked with some sort of pattern; this varies from marbling or scribbling to longitudinal dark lines which is more common in females than males. The intensity of the throat markings is variable. The lores and supra-, infra-, and sublabials are contrastingly marked with dark and pale and the lip markings extend ventrally to give rise to the throat pattern. The male dewlaps are deep orange in life (Pl. 12F9); two dead males had comparable dewlaps (Pl. 12F9, Pl.12H8). The deep orange color of the dewlap center is slightly richer along the margin.

Comparisons. A. s. abditus requires comparison with the taxa *A. s. strahmi* and *A. l. specuum. Anolis cybotes* also occurs sympatrically with both subspecies of *A. strahmi,* but it is easily distinguishable in dewlap color (pale yellow, pale pink, almost white), smaller snout-vent length, and much larger ventral scales. *Anolis breviros-*

tris, a small gray dorsoventrally compressed species with a pale yellow dewlap and a paramedian double row of snout scales, also is syntopic with *A. s. abditus*.

The two subspecies of *A. strahmi* are very similar, although they are altitudinally and geographically separated. The dewlaps in both are deep and rich orange (to orange-brown in *A. s. strahmi*) and reach the same size in both sexes. *A. s. strahmi* differs from *A. s. abditus* in that the former has modally eight scales in the supraorbital discs versus six or seven in *A. s. abditus*. Dorsal coloration in *A. s. strahmi* is pale gray versus tan to grayish tan in *A. s. abditus*. The dorsum is at best flecked and often unpatterned in *A. s. strahmi* males versus relatively prominent dumbbell or hourglass remnants in both sexes of *A. s. abditus*. Finally, throats in both sexes of *A. s. strahmi* are rarely marked versus throats in both sexes of *A. s. abditus* which are marked with flecking, dotting, scribbling, or lines. The dorsal color and pattern, as well as the throat markings, are the most distinctive characteristics separating the two subspecies.

A. s. abditus has not as yet been taken sympatrically or syntopically with *A. l. specuum* (see Fig. 1); it is unlikely that these two species will be taken together since both are clivicolous. Though they seem to be ecological equivalents, it is possible that at some locality on the Península de Barahona they occur together. The two species should be easily differentiable, if they are sympatric. The dewlap in *A. s. abditus* is deep orange, whereas that of *A. l. specuum* is dull or dirty yellow to pale orange. *A. s. abditus* reaches a larger size (males to 79 mm, females to 63 mm) than does *A. l. specuum* (males to 72 mm, females to 59 mm). Although there are three to five postrostral scales in both taxa, the mode in *A. s. abditus* is three and in *A. l. specuum* is four or five. Two other scale relationships will aid in differentiating the two species. In *A. l. specuum*, there are more often 0/0–1/1 scales between the supraorbital semicircles and the interparietal (64% of the specimens) whereas in *A. s. abditus* there are more often 1/2–3/3 (79%) scales in this position. *A. l. specuum* more often (33%) has the subocular scales in contact with the supralabials than does *A. s. abditus* (3%). Although none of these scale counts or relationships is absolute, in combination they serve to differentiate the two species.

There are some striking resemblances between *A. l. specuum* and *A. s. abditus* in color and pattern. The former is brown with darker

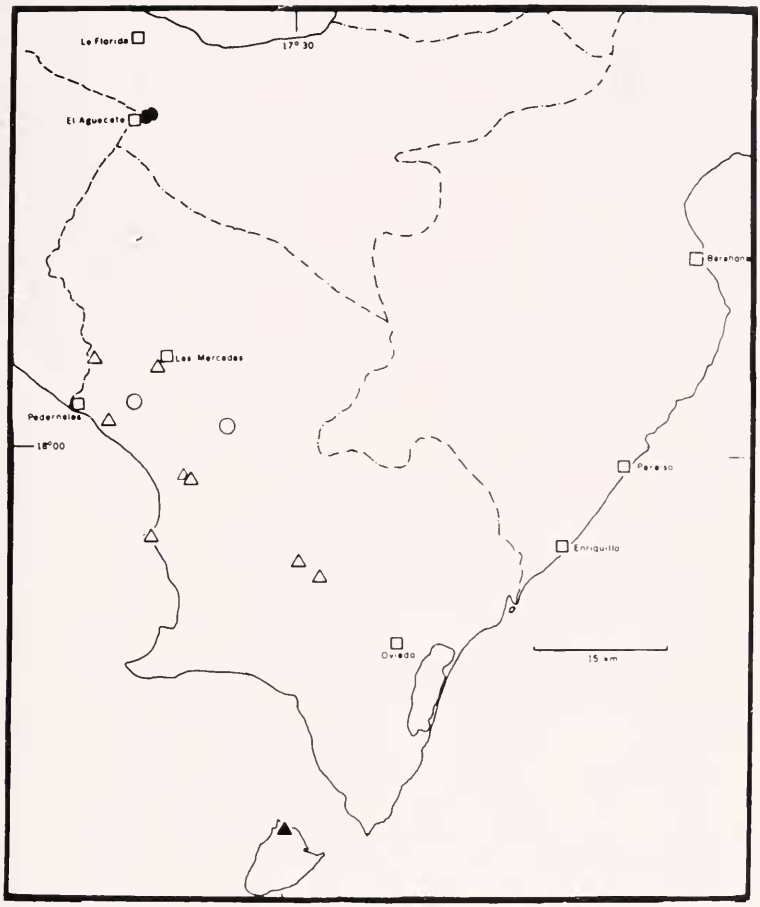

Figure 1. Map of the Península de Barahona, República Dominicana, Hispaniola, and Isla Beata. Pertinent population centers are indicated by labeled squares. Known distributions are shown for the anoles *A. longitibialis* (triangles) and *A. strahmi* (circles). The distributions are further designated for *A. l. longitibialis* (solid triangle), *A. l. speciuum* (hollow triangles), *A. s. strahmi* (solid circles), and *A. s. abditus* (hollow circles).

brown markings whereas the latter is tan to grayish tan with brown markings. Both are prominently marked dorsally with 4 dumbbells; however, in *A. l. specuum*, the first dumbbell is well developed laterally and open anteriorly to yield a large almost ocellus-like spot. The dewlap colors of the two species are extremely distinctive since no *A. l. specuum* is known that has the deep orange dewlap of *A. s. abditus*. One final feature serves to distinguish the two species in this area. *A. l. specuum* males most often have the throat immaculate as adults (one adult male is known with a streaked throat) whereas the throat is invariably patterned in *A. s. abditus* males. All *A. s. abditus* females have marked throats whereas the throats of *A. l. specuum* females are variable — from immaculate to streaked with dark brown.

Remarks. There are only two localities for *A. s. abditus*. The first is a ravine (the type locality) between the Pedernales-Oviedo road and the village of Las Mercedes. At about 2.5 km N of the main road, the dirt road to Las Mercedes passes (for about 1 km) through a shaded and broad ravine with reddish rocky natural cliffs on both sides. These cliffs are creviced and have solution holes, but are separated from the road itself by low talus slopes which extend some five to ten meters between the cliffs and the roadway. The flora of the ravine stands in strong contrast to the *Acacia*-cactus desert which surrounds it; the ravine is distinctly more mesic, with trees and an understory of grasses, herbs and *Bryophyllum*. At the time of our 1975 visit the outside desert was exceptionally parched whereas the ravine was modestly luxuriant and moist. The ravine is almost at sealevel but at its northern end the road begins the ascent of the lower front ranges of the Sierra de Baoruco on which the village of Las Mercedes lies. The second locality is on the Alcoa road between Cabo Rojo and Aceitillar; I have not visited the site but William E. Haas (*in litt.*, 22 October 1976) wrote that it is "up a path just past km 16 on the Alcoa truck road, and the habitat is somewhat different [from the type locality] and the physiography a bit more so."

At the time of our 29 July 1975 visit to the type locality, the lizards were scarce at 1300 hr. The sun was almost directly overhead and the ravine was hot although fairly well shaded. As the afternoon progressed, the lengthening shadows of the western wall began to fill the ravine and by 1530 hr the lizards were moderately abundant.

They inhabited crevices and solution holes in the cliff faces (much after the fashion of *A. s. strahmi*). One male was seen foraging at 1630 hr on a shrub adjacent (1 m) to the cliff and had a large caterpillar in its mouth when collected. Foraging thus involves securing food elsewhere than directly on the cliff face itself. A very small juvenile was dislodged from the basal rosette of a moderately sized dead sisal plant (*Agave*) on the cliff face but escaped without being collected. One behavorial incident is worthy of report: we pursued a large male along the cliff face and the lizard finally leaped to an isolated large (2 m diameter) boulder, ran across its top at full tilt and literally launched itself off the far side of the boulder onto the ground. Several minutes later the same lizard was collected within a few centimeters of the boulder's base, immobile in the grassy and herbaceous ground cover. Whether its immobility was traumatic or whether it was "hiding" in a very unusual situation is unknown. This is one of only two instances when *A. strahmi* was secured in any situation other than a clivicolous one (the other exception is the female *A. s. strahmi* on the dead stem near the cliff base at El Aguacate). As with *A. s. strahmi, A. s. abditus* is impressively "at home" on its cliff faces. It is very agile, and its camouflage, tendency to remain immobile when approached — relying upon its cryptic coloration, and its prompt recovery time, all are extremely similar to those features in the behavior of *A. s. strahmi.*

DISCUSSION

It seems obvious that *A. longitibialis* and *A. strahmi* form a compact and closely related duo of cybotoid anoles whose distribution centers upon the Península de Barahona. Although I am convinced that they represent two separate species rather than subspecies, the latter interpretation is not to be lightly dismissed. There are no absolute meristic characters which separate the two, and they are similar in many features, not the least of which is their predilection for cliffs and vertical rocky surfaces to which they are unquestionably adapted. If, however, *A. longitibialis* and *A. strahmi* are conspecific, the peninsular distribution of the latter is peculiar in that it seems to be in enclaves surrounded on both east and west by (or interdigitating with) *A. longitibialis.* This arrangement can be

interpreted as a mosaic, where one species (*A. longitibialis*) inhabits open and xeric cliff faces and the other (*A. strahmi*) inhabits shaded, more mesic, and less rigorous cliffs. The dewlap colors of the two species are very distinctive and since dewlap color in eye-minded anoles is so important in species recognition and territorial defense, the very fact of the striking color differences of dewlaps in these two taxa strongly suggests that they are indeed species. The situation here is not so complex as that between *A. cybotes* and *A. marcanoi* (Williams, 1975): in this case two unquestioned species without strong meristic differences but with distinctive and contrasting dewlap colors and different body patterns are sympatric and even rarely syntopic. In these two species, however, there appear to be subtle differences in habitat preference, and as Williams (1975:9) pointed out the "balance of power" between them in any particular area may be tenuous. The same situation may exist in the geographical and ecological relationships between *A. longitibialis* and *A. strahmi* on the peninsula but presently the differences seem more overt.

More puzzling is the occurrence of two subspecies of *A. strahmi* on the north and south slopes of the Sierra de Baoruco. This is coupled with the striking difference in elevations involved (near sea level, and between 854 and 900 m). The habitats of the two subspecies are comparable — generally creviced cliff faces or roadcuts which can be regarded as cliff-face surrogates. But the similarity ceases with this description. The ravine near Pedernales, although it transects an otherwise hostile and xeric area, has relatively luxuriant vegetation and is well shaded. The El Aguacate roadcut is open and exposed to direct sunlight (the same is true for localities where *A. longitibialis* has been taken on the peninsula itself) and the lizards seem to shun those sections of the roadcut that are heavily vegetated and overgrown. Even sections of the roadcut that are exposed and open often lack or have minimal populations of *A. strahmi*. The area is quite cool in the afternoon and cold at night. One explanation for the apparently precise niche occupied by *A. s. strahmi* may well be that, at such high elevations, insolation of cliff faces and lack of vegetational cover will determine the diurnal rhythm of these lizards. Cliffs, exposed or not, facing in directions where the sunlight will not reach them until rather late in the morning are unsuitable because of lack of time exposed to the

warming effect of the sun. In contrast, vegetationally covered cliffs, even those oriented to achieve maximum early insolation, are too protected by vegetation to allow the lizards a sufficient period of activity during each day.

The disjunct nature of the two subspecies of *A. strahmi* may be more an artifact than a reality. There are few suitable cliff faces readily attainable by road in this entire region. It seems likely that *A. strahmi* inhabits suitable habitats around the general periphery of the Sierra de Baoruco. Cliffs and roadcuts on the peninsula along the eastern edge of the mountains between Barahona and Enriquillo were searched casually. These cliffs are often at sea level but are well shaded and generally face east. We found both *A. cybotes* and *A. brevirostris* here but not *A. strahmi* or *A. longitibialis*. Such negative evidence is questionable at best, although we did not find *A. cybotes* syntopically on cliffs or roadcuts with either of the clivicolous species. However, *A. cybotes* does occur sympatrically (but not on cliffs) with *A. l. specuum* and both subspecies of *A. strahmi*. It is interesting to note that in those places where *A. cybotes* inhabits cliffs and roadcuts it is much less adapted for such habitats than are the two clivicolous species. When pressed *A. cybotes* is more likely to leave the cliff face and jump to the ground to seek refuge under adjacent ground cover than are *A. longitibialis* or *A. strahmi* which seek sanctuary in crevices or solution holes.

Geographically it seems likely that there are more or less discontinuous populations of *A. strahmi* scattered around the periphery of the Sierra de Baoruco (but not across its summit) and the lower eastern regions of the adjacent Haitian Massif de la Selle. Populations should be looked for on the bare roadcut-cliffs between Fond Parisien and Soliette and on the northern face of the La Selle in Haiti near the Dominico-Haitian border south of Fond Verrettes. Although these cliffs seem suitable (more for *A. s. abditus* than for *A. s. strahmi*), it may be that an appropriate habitat niche occurs in this region which will accommodate the latter subspecies. If *A. s. strahmi* did occur there at suitable elevations on the northern face of the Massif de la Selle, it may now be extirpated due to extreme modification of habitat (the region has been denuded of much vegetational cover).

A. longitibialis, on the other hand, presents a more familiar pattern. It is a Barahona Entrapment xerophile derived from

primarily mesophilic *A. cybotes* with which, under favored circumstances, it is still sympatric. From the peninsula it has invaded Isla Beata and differentiated on the subspecific level. A phyletic sequence between these three species might well be: widely distributed, ecologically tolerant but primarily mesophilic *A. cybotes* with a pale dewlap → xeric and cliff adapted *A. longitibialis* with a pale dewlap → clivicolous and more mesic adapted *A. strahmi* with a vividly colored dewlap limited to disjunct enclaves where its ecological requirements are rather precisely met.

Another possibility that should not be overlooked is that the four taxa involved (*longitibialis, specuum, strahmi, abditus*) should be regarded as separate species. Certainly they are isolated from each other (*longitibialis* is insular; *specuum* occurs on the Península de Barahona; *strahmi* and *abditus* occur to the north and south of the Sierra de Baoruco massif, respectively). Regarding them as species has much to recommend it, but I have taken the more conservative course that no external characteristics are sufficiently obvious to make one seriously consider that there are four species involved rather than two. However, skeletal or electrophoretic evidence might well prove differently.

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